WHAT IS CLAIMED IS:

1. A process for adjusting the composition of a dispersion comprising particulate matter, the process comprising:

establishing a pressure differential across a filter membrane supported on a filtration head and separating a dispersion contained in a vessel from a permeate reception zone that is in fluid flow communication with said membrane, said membrane being immersed in said dispersion and said dispersion having particulate solids and ionic contaminants contained therein;

during a filtration phase, causing liquid to flow through said membrane and into said permeate reception zone under the influence of said pressure differential, thereby forming a permeate in said reception zone and a retentate in said vessel; and

during a backflushing phase, reversing the pressure differential across said membrane and causing a backflush liquid to flow through said filter membrane, said backflush liquid having a lower concentration of ions of the type contaminating the dispersion than said permeate stream.

2. A process for adjusting the composition of a dispersion comprising particulate matter, the process comprising:

introducing a filtration head into a vessel containing a dispersion comprising solid particles, said filtration head comprising a filter membrane carried by and in fluid flow communication with a conduit for removal of permeate;

immersing said filter membrane in said dispersion;

during a filtration phase, establishing a pressure differential across said filter membrane, thereby causing liquid to flow through said membrane to form a permeate stream downstream of said filter membrane and a retentate in said vessel;

during a backflushing phase, reversing the pressure differential across said membrane and causing a backflush liquid to flow through said filter membrane;

alternating said filtration phase and said backflushing phase through a series of cycles; and

introducing a wash liquid into said retentate to fully or partially compensate for fluid removed from said vessel in said permeate.

3. A process for adjusting the composition of a dispersion comprising particulate matter, the process comprising:

contacting a filtration head comprising a filter membrane with a dispersion contained in a vessel comprising a fluid and particulate solids, said filtration head comprising a filter membrane and a permeate receiving enclosure in communication with said membrane on the opposite side of said membrane from said dispersion;

during a filtration phase, establishing a pressure differential across said membrane causing liquid to flow through said membrane and into said permeate receiving enclosure under the influence of said pressure differential, thereby forming a permeate in said receiving enclosure while retaining particulate solids in a retentate formed in said vessel; and

during a backflushing phase, reversing the pressure differential across said membrane and causing a backflush liquid to flow through said filter membrane to the interior of said vessel for removal of particulate solids from said membrane; and

introducing a wash liquid into said retentate.

4. A process for adjusting the composition of a dispersion comprising particulate matter, the process comprising:

establishing a pressure differential across a filter membrane supported on a filtration head and separating a

dispersion contained in a vessel from a permeate reception zone that is in fluid flow communication with said membrane, said membrane being immersed in said dispersion and said dispersion having particulate solids and ionic contaminants contained therein;

during a filtration phase, causing liquid to flow through said membrane and into said permeate reception zone under the influence of said pressure differential, thereby forming a permeate in said reception zone and a retentate in said vessel; and

measuring the conductivity of either of said retentate or said permeate.

5. A process as set forth in claim 1, 2, 3 or 4 wherein said backflush liquid is mixed with said retentate.

6. A process as set forth in claim 1, 2, 3 or 4 further comprising introducing a wash liquid into said retentate in said vessel.

7. A process as set forth in claim 6 wherein said wash liquid is effective to dilute said retentate.

8. A process as set forth in any of the preceding claims 1 through 7 comprising repetitive cycles of alternating filtration and backflushing phases.

9. A process as set forth in claim 8 wherein said wash liquid is continuously or intermittently introduced into said vessel to maintain the concentration of said particulate solids in said retentate substantially constant over a plurality of said repetitive cycles.

10. A process as set forth in claim 8 or 9 wherein said wash liquid is delivered to said vessel via a conduit integral with said microfilter.

11. A process as set forth in claim 8 or 9 wherein said wash liquid is delivered to said vessel via a conduit separate from said microfilter.

12. A process as set forth in claim 8 or 9 wherein said dispersion initially contains ionic materials dissolved therein, the concentration of said ionic materials being progressively reduced by repetitive removal of permeate and introduction of wash liquid into said vessel for dilution of said retentate.

13. A process as set forth in claim 12 wherein the conductivity of said retentate and/or said permeate is measured.

14. A process as set forth in claim 13 wherein said repetitive cycles of filtration and backflushing are terminated upon attainment of a target conductivity value.

15. A process as set forth in any of the preceding claims 1 through 14 wherein said solid particles removed from said membrane during said backflushing phase are mixed with said retentate.

16. A process as set forth in any of claims 8 through 15 wherein the frequency and volume of backflushing are controlled to achieve a desired rate of production of permeate.

17. A process as set forth in claim 16 wherein said desired rate of production of permeate is greater than the rate of production of permeate achievable at a backflushing frequency of one half said controlled frequency.

18. A process as set forth in claim 16 or 17 wherein the frequency and volume of backflushing are controlled to

provide a substantially maximum achievable rate of production of permeate.

19. A process as set forth in claim 18 wherein the actual rate of production of permeate is at least about 85% of the maximum achievable rate of production thereof at an optimal combination of backflushing frequency and volume.

20. A process as set forth in any of the preceding claims 1 through 19 wherein said filter membrane is carried by a conduit that is immersed in said dispersion and in fluid flow communication with a permeate receiver, said permeate reception zone comprising said conduit and receiver and being in fluid flow communication with the interior of said vessel only through said filter membrane.

21. A process as set forth in any of the preceding claims 1 through 20 wherein, during said filtration phase, the flow of fluid at the interface of said dispersion and said filter membrane is primarily normal to said membrane rather than tangential thereto.

22. A process as set forth in claim 21 wherein the component of flow of fluid normal to said interface during said filtration phase is at least three times the component of flow tangential to said interface.

23. A process as set forth in any of the preceding claims 1 through 22 wherein said pressure differential is maintained substantially constant during said filtration phase.

24. A process as set forth in claim 23 wherein said vessel is under substantially atmospheric pressure and a vacuum is applied to said receiver.

25. A process as set forth in any of the preceding claims 1 through 24 wherein said permeate is transferred to a receiver that is in fluid flow communication with said conduit.

26. A process for adjusting the composition of a dispersion comprising particulate matter in a liquid medium, the process comprising:

exposing the surface of a filter membrane to a dispersion comprising liquid and particulate matter,

causing liquid to flow through said filter membrane thereby forming a permeate stream downstream of said filter membrane relative to the flow of liquid therethrough and a retentate upstream of said filter membrane, whereby the liquid medium flows in more than one direction tangential to the face of said filter membrane.

27. A process for adjusting the composition of a dispersion comprising particulate matter in a liquid medium, the process comprising:

exposing the surface of a filter membrane supported on a filtration head to a dispersion comprising liquid and particulate matter, said filtration head comprising a permeate conduit and a backflush conduit, each in fluid communication with said filter membrane;

causing liquid to flow through said filter membrane thereby forming a permeate stream downstream of said filter membrane relative to the flow of said liquid medium therethrough and a retentate upstream of said filter membrane, whereby said liquid medium flows in more than one direction tangential to the face of said filter membrane; and

introducing a backflush liquid through said backflush conduit to said filter membrane in a backflushing direction.

28. A process for adjusting the composition of a dispersion comprising particulate matter in a liquid medium, the process comprising:

exposing the surface of a filter membrane supported on a filtration head to a dispersion comprising liquid and particulate matter;

during a filtration phase, causing liquid to flow through said filter membrane, thereby forming a permeate stream downstream of said filter membrane relative to the flow of liquid therethrough and a retentate upstream of said filter membrane; and

during a backflushing phase, passing a liquid stream through said filter membrane in the direction opposite the flow of said permeate stream, the liquid stream having a lower concentration of ions contaminating said dispersion than said permeate stream passing through said membrane immediately prior to said backflushing phase.

29. A process for adjusting the composition of a dispersion comprising particulate matter in a liquid medium, the process comprising:

exposing the surface of a filter membrane to a dispersion comprising liquid and particulate matter;

during a plurality of filtration phases, causing liquid to flow through said filter membrane thereby forming a permeate stream downstream of said filter membrane relative to the flow of liquid therethrough and a retentate upstream of said filter membrane; and

during a plurality of backflushing phases, passing a liquid through said filter membrane in the direction opposite the flow of said permeate stream, wherein said backflushing phases are controlled to achieve a desired rate of passage of liquid through said filter membrane.

30. A process for adjusting the composition of a dispersion comprising mesoporous crystalline particles in a liquid medium, the process comprising:

exposing the surface of a filter membrane to a dispersion comprising liquid and mesoporous crystalline particles; and

causing liquid to flow through said filter membrane, thereby forming a permeate stream substantially free of said mesoporous crystalline particles downstream of said filter membrane relative to the flow of liquid therethrough and a retentate upstream of said filter membrane, whereby said liquid medium flows in more than one direction tangential to the face of said filter membrane.

31. A process as set forth in claim 4, 26, 27, 28, 29 or 30 wherein liquid flows through said filter membrane during a filtration phase and further comprising a backflushing phase comprising passage of a liquid through said filter membrane in the direction opposite the flow of said permeate stream.

32. A process as set forth in claim 31 wherein during a backflushing phase particles present on the upstream surface of said filter membrane relative to the flow of liquid therethrough are removed therefrom.

33. A process as set forth in any of the preceding claims 1 through 32 comprising repetitive cycles of alternating filtration and backflushing phases.

34. A process as set forth in claim 33 wherein during a backflushing phase from about 75 to about 250 μl of said backflush liquid is introduced to said filter membrane.

35. A process as set forth in claim 33 wherein during a backflushing phase from about 100 to about 200 μl of said backflush liquid is introduced to said filter membrane.

36. A process as set forth in claim any of the preceding claims 1 through 35 comprising multiple

backflushing phases wherein the frequency of backflushing phases is controlled in order to maintain a desired permeate flux.

37. A process as set forth in any of the preceding claims 1 through 36 wherein the frequency of backflushing phases is adjusted in response to the permeate flux or a function thereof.

38. A process as set forth in any of the preceding claims 1 through 37 comprising multiple backflushing phases wherein the volume of liquid introduced to said filter membrane during a backflushing phase is controlled in order to maintain a desired permeate flux.

39. A process as set forth in any of the preceding claims 1 through 38 wherein the volume of liquid introduced to said filter membrane during each backflushing phase is adjusted in response to the permeate flux or a function thereof.

40. A process as set forth in any of the preceding claims 1 through 39 wherein the frequency of backflushing phases and volume of backflush liquid introduced to said filter membrane thereby are adjusted to maximize permeate flux.

41. A process as set forth in any of the preceding claims 1 through 40 wherein said backflush liquid introduced to said filter membrane comprises a reduced concentration of ionic materials as compared to said permeate stream.

42. A process as set forth in any of the preceding claims 1 through 41 wherein the dispersion is agitated such that said liquid medium flows in more than one direction tangential to the face of said filter membrane.

43. A process as set forth in any of the preceding claims 1 through 42 wherein said particulate matter comprises mesoporous crystalline particles.

44. A process as set forth in any of the preceding claims 1 through 43 wherein the concentration of particulate matter in said dispersion prior to flow of liquid through said filter membrane is at least about 1% by weight.

45. A process as set forth in any of the preceding claims 1 through 44 wherein the concentration of particulate matter in said dispersion prior to flow of liquid through said filter membrane is from about 1 to about 25% by weight.

46. A process as set forth in claim 44 wherein the concentration of particulate matter in said dispersion prior to flow of liquid through said filter membrane is from about 5 to about 20% by weight.

47. A process as set forth in any of the preceding claims 1 through 46 wherein liquid flows through said filter membrane under the influence of a pressure differential across said filter membrane.

48. A process as set forth in any of the preceding claims 1 through 47 wherein the pressure differential across said filter membrane is induced by applying a vacuum downstream of said filter membrane.

49. A process as set forth in any of the preceding claims 1 through 48 wherein the pressure differential across said filter membrane is substantially constant.

50. A process as set forth in any of the preceding claims 1 through 49 wherein the average flux of permeate

per unit area of filter membrane is from about 0.1 to about 100 ml/cm^2•min.

51. A process as set forth in claim 49 wherein the average flux of permeate per unit area of filter membrane is from about 0.15 to about 1.0 ml/cm^2•min.

52. A process as set forth in claim 49 wherein the average flux of permeate per unit area of filter membrane is from about 0.4 to about 0.6 ml/cm^2•min.

53. A process as set forth in any of the preceding claims 1 through 52 wherein the initial flux of permeate per unit area of filter membrane over the period from the start of flow of liquid through the filter membrane to about 1 second after flow of liquid through the filter membrane begins is from about 20 to about 35 ml/cm^2•min.

54. A process as set forth in any of the preceding claims 1 through 53 wherein at least about 40% by weight of said particulate matter present in said dispersion prior to flow of liquid through said filter membrane is recovered upstream of said filter membrane.

55. A process as set forth in claim 53 wherein at least about 50% by weight of said particulate matter present in said dispersion prior to flow of liquid through said filter membrane is recovered upstream of said filter membrane.

56. A process as set forth in claim 53 wherein at least about 60% by weight of said particulate matter present in said dispersion prior to flow of liquid through said filter membrane is recovered upstream of said filter membrane.

57. A process as set forth in claim 53 wherein from about 40% to about 80% by weight of said particulate matter present in said dispersion prior to flow of liquid through said filter membrane is recovered upstream of said filter membrane.

58. A process as set forth in claim 53 wherein from about 45% to about 75% by weight of said particulate matter present in said dispersion prior to flow of liquid through said filter membrane is recovered upstream of said filter membrane.

59. A process as set forth in claim 53 wherein from about 50% to about 70% by weight of said particulate matter present in said dispersion prior to flow of liquid through said filter membrane is recovered upstream of said filter membrane.

60. A process as set forth in any of the preceding claims 1 through 59 wherein at least about 60% by weight of said particulate matter has a particle size distribution from about 0.50 to about 0.80 μm.

61. A process as set forth in any of the preceding claims 1 through 60 herein the conductivity of said retentate is less than about 100 μSiemens/cm.

62. A process as set forth in claim 60 wherein the conductivity of said retentate is from about 10 to about 50 μSiemens/cm.

63. A process as set forth in any of the preceding claims 1 through 62 wherein said filter membrane comprises a sheet of permeable or semi-permeable material constructed of materials selected from the group consisting of cellulose acetate, polyvinyllidene fluoride, polytetrafluoroethylene and polycarbonate.

64. A process as set forth in any of the preceding claims 1 through 63 comprising a filter membrane having a pore size of from about 0.10 to about 3.0 μm.

65. A process as set forth in any of the preceding claims 1 through 64 comprising a filter membrane having a pore size of from about 0.10 to about 0.70 μm.

66. A process as set forth in any of the preceding claims 1 through 65 comprising a filter membrane having a pore size of from about 0.20 to about 0.45 μm.

67. A process as set forth in any of the preceding claims 1 through 66 comprising a filter membrane having a porosity of from about 50 to about 90%.

68. A process as set forth in any of the preceding claims 1 through 67 comprising a filter membrane having a porosity of from about 70 to about 75%.

69. A process as set forth in any of the preceding claims 1 through 68 wherein said filter membrane is selected such that at least about 60 % of particulate matter present in said dispersion has a particle size greater than the pore size of said filter membrane.

70. A process as set forth in any of the preceding claims 1 through 69 comprising a filter membrane having an extractable water measurement of less than about 5.0%.

71. A process as set forth in any of the preceding claims 1 through 70 comprising a filter membrane having an extractable water measurement of from about 0.5 to about 5.0%.

72. A process as set forth in any of the preceding claims 1 through 71 further comprising introducing a wash liquid to said retentate.

73. A process as set forth in claim 72 wherein prior to addition of wash liquid the conductivity of the dispersion is from about 60,000 to about 400,000 μSiemens/cm.

74. A process as set forth in claim 73 wherein the ratio of the rate of supply of wash liquid to the rate of permeate flow is less than about 1.

75. A process as set forth in claim 74 wherein the wash liquid is selected from the group consisting of deionized water, xylene, methanol, acetone.

76. A process as set forth in claim 74 wherein said wash liquid comprises deionized water.

77. A process as set forth in claim 76 wherein addition of wash liquid to the retentate is discontinued when the conductivity of the retentate or permeate reaches a predetermined level.

78. A process as set forth in claim 77 wherein said dispersion contains ionic materials dissolved therein, the concentration of ionic materials being progressively reduced by flow of liquid through said filter membrane and diluting said retentate by addition of wash liquid.

79. A process as set forth in claim 78 wherein the concentration of ionic material dissolved in said permeate stream is monitored.

80. A process as set forth in claim 79 wherein the concentration of ionic materials is monitored by measurement of the conductivity of said permeate stream.

81. A process as set forth in claim 80 wherein addition of wash liquid to said retentate is discontinued when the conductivity of said permeate stream reaches a predetermined level.

82. A process as set forth in claim 81 wherein the period of time during which wash liquid is introduced to said retentate comprises a dilution phase.

83. A process as set forth in claim 82 wherein upon completion of a dilution phase the conductivity of said retentate is from about 10 to about 40 μSiemens/cm.

84. A process as set forth in claim 83 wherein liquid flows through said filter membrane during said dilution phase.

85. A process as set forth in any of the preceding claims 1 through 84 wherein said filter membrane is supported on a filtration head.

86. A process as set forth in claim 85 wherein said filtration head comprises a permeate conduit and a backflush conduit, each in fluid communication with said filter membrane.

87. A process as set forth in claim 85 wherein a predetermined amount of permeate is recovered in said permeate conduit.

88. A process as set forth in claim 87 wherein said permeate stream flows through said permeate conduit and

into means for collecting said permeate stream in fluid communication with said permeate conduit.

89. A process as set forth in claim 87 wherein a backflush liquid is introduced to said filter membrane via said backflush conduit in a backflushing direction.

90. A process as set forth in claim 85 wherein said filtration head further comprises a wash liquid conduit for delivery of wash liquid to said retentate.

91. A process as set forth in claim 85 wherein said dispersion is contained within a vessel and said filter membrane is exposed to said dispersion therein.

92. A process as set forth in claim 91 wherein wash liquid is added to said vessel before the flow of liquid through said filter membrane begins such that said vessel is occupied to a predetermined liquid level.

93. A process as set forth in claim 92 wherein the addition of liquid to said retentate maintains the volume of said retentate in said vessel at a predetermined level.

94. A process as set forth in claim 93 wherein retentate is removed from said vessel and dried solids recovered therefrom are analyzed without further processing.

95. A process as set forth in claim 94 wherein said dried solids are analyzed by x-ray diffraction.

96. A process as set forth in claim 94 wherein said dried solids are analyzed using a scanning electron microscope.

97. A process as set forth in claim 94 wherein particulate matter is recovered from said retentate by drying.

98. A process as set forth in claim 94 wherein said particulate matter recovered from said retentate is pressed to prepare catalysis material.

99. A process as set forth in claim 98 wherein said particulate material is pressed to prepare catalysis material by cold isostatic pressing.

100. A process for adjusting the composition of each of a plurality of dispersions comprising particulate matter and a fluid medium, the process comprising:

concurrently exposing each of a plurality of filter membranes to a dispersion of said plurality of dispersions, the dispersion to which each of said plurality of membranes is exposed being separate from any dispersion to which any other of said plurality of membranes is exposed;

concurrently causing fluid to flow through each of said membranes to form a permeate downstream of each membrane and a retentate upstream thereof, thereby forming a plurality of separate permeates and a plurality of separate retentates; and

introducing a wash liquid into each of said separate retentates.

101. A process as set forth in claim 100 further comprising flow of the plurality of permeates into a plurality of permeate reception zones, each of said plurality of permeates flowing into a reception zone that is separate from any reception zone into which any other of said plurality of permeates flows.

102. A process as set forth in claim 101 wherein said plurality of permeate reception zones comprises an array of

permeate reception zones oriented for parallel delivery of said plurality of permeates to said plurality of reception zones.

103. A process as set forth in any of the preceding claims 100 through 102 wherein each of said plurality of dispersions is separately exposed to a filtration membrane in one of a plurality of spatially discrete vessels.

104. A process as set forth in any of the preceding claims 100 through 103 wherein said plurality of vessels comprises an array of vessels oriented for parallel filtration operations.

105. A process as set forth in any of the preceding claims 100 through 104 wherein each of said plurality of filter membranes is supported on one of a plurality of filtration heads.

106. A process as set forth in any of the preceding claims 100 through 105 wherein each of said filtration heads comprises a permeate conduit for flow of permeate in a filtering direction and a backflush conduit for introducing a backflush liquid to each of said plurality of filter membranes in a backflushing direction.

107. A process as set forth in any of the preceding claims 100 through 106 wherein fluid flows through said filter membranes in a filtering direction during a filtration phase and further comprising a backflushing phase wherein a liquid stream is introduced to said plurality of filter membranes in a backflushing direction.

108. A process as set forth in any of the preceding claims 100 through 107 wherein said plurality of filter membranes comprises an array of filter membranes oriented

for parallel delivery of said plurality of dispersions to said plurality of membranes.

109. An apparatus adapted for filtration of a dispersion comprising particulate matter in a fluid medium, the apparatus comprising:

a filter membrane supported on a filtration head for flow of fluid through the filter membrane in a filtering direction to produce a permeate stream downstream of the filter membrane,

a permeate conduit for receiving said permeate stream, and

a backflush conduit for receiving a backflushing fluid and directing a backflushing fluid through the filter membrane in a backflushing direction.

110. An apparatus adapted for filtration of a dispersion comprising particulate matter in a liquid medium, the apparatus comprising:

a filter membrane supported on a filtration head for flow of liquid through the filter membrane in a filtering direction to produce a permeate stream downstream of the filter membrane,

a permeate conduit for receiving said permeate stream, and

electrodes for measuring the conductivity of said permeate stream.

111. The apparatus as set forth in claim 110 wherein the electrodes are located within the filtration head.

112. The apparatus as set forth in claim 110 wherein the electrodes are located within the permeate conduit.

113. An apparatus adapted for filtration of a dispersion comprising particulate matter in a liquid medium, the apparatus comprising:

a filter membrane supported on a filtration head for flow of liquid through the filter membrane in a filtering direction to produce a permeate stream downstream of the filter membrane,

a permeate conduit for receiving said permeate stream, and

a backflush conduit for receiving a backflushing liquid and directing a backflushing liquid through the filter membrane in a backflushing direction.

114. The apparatus as set forth in claim 109 or 113 wherein said filter membrane comprises a sheet of permeable or semi-permeable material constructed of materials selected from the group consisting of cellulose acetate, polyvinylidene fluoride, polytetrafluoroethylene and polycarbonate.

115. The apparatus as set forth in claim 109 or 113 wherein the pore size of said filter membrane is from about 0.10 to about 3.0 μm.

116. The apparatus as set forth in claim 109 or 113 wherein the pore size of said filter membrane is from about 0.10 to about 0.70 μm.

117. The apparatus as set forth in claim 109 or 113 wherein the pore size of said filter membrane is from about 0.20 to about 0.45 μm.

118. The apparatus as set forth in claim 109 or 113 wherein the porosity of said filter membrane is from about 50 to about 90%.

119. The apparatus as set forth in claim 109 or 113 wherein the porosity of said filter membrane is from about 70 to about 75%.

120. The apparatus as set forth in claim 109 or 113 wherein said permeate conduit is connected to a source of low pressure.

121. The apparatus as set forth in claim 109 or 113 wherein said filtration head is adapted for placement in a vessel containing said dispersion.

122. The apparatus as set forth in claim 121 wherein said filtration head is adapted for placement in said vessel such that at least a portion of said filter membrane is immersed in said dispersion.

123. The apparatus as set forth in claim 122 wherein said filtration head is adapted for placement in said vessel such that the wetted surface area of said filter membrane comprises from about 10 to about 80% of the wetted surface area of said apparatus.

124. The apparatus as set forth in claim 123 wherein said filtration head is adapted for placement in said vessel such that the wetted surface area of said filter membrane comprises from about 45 to about 55% of the wetted surface area of said apparatus.

125. The apparatus as set forth in claim 122 wherein said filtration head is adapted for placement in said vessel such that the ratio of the wetted surface area of said filter membrane to the wetted surface area of said apparatus is at least about 2:1.

126. The apparatus as set forth in claim 122 wherein the ratio of the volume of liquid in said vessel to the unit wetted surface area of said filtration head is at least about 5:1.

127. The apparatus as set forth in claim 109 or 113 wherein said permeate conduit and backflush conduit are each located on the downstream side of said filter membrane and arranged substantially normal to said filter membrane.

128. The apparatus as set forth in claim 109 or 113 wherein said filtration head further comprises a filter support for securing said filter membrane in a position on the filtration head whereby liquid may flow therethrough.

129. The apparatus as set forth in claim 128 wherein said filter support is removably secured to one of said permeate and backflush conduits in a position downstream of the filter membrane.

130. The apparatus as set forth in claim 129 further comprising an end cap threadable on said one conduit for removably securing said filter membrane and filter support in place.

131. The apparatus as set forth in claim 109 or 113 wherein one of said permeate and backflush conduits is concentrically disposed inside the other.

132. The apparatus as set forth in claim 131 wherein said backflush conduit is disposed inside said permeate conduit to form an annular space between the two conduits.

133. The apparatus as set forth in claim 132 wherein said permeate conduit comprises said annular space.

134. The apparatus as set forth in claim 132 further comprising a fitting having a threaded connection with said permeate conduit around said backflush conduit for holding said backflush conduit in fixed position relative to said permeate conduit.

135. The apparatus as set forth in claim 132 wherein the cross-sectional area of said permeate conduit is from about 0.05 to about 500 mm^2.

136. The apparatus as set forth in claim 132 wherein the cross-sectional area of said backflush conduit is from about 0.05 to about 100 mm^2.

137. The apparatus as set forth in claim 132 wherein the ratio of the cross-sectional area of said permeate conduit to the cross-sectional area of said backflush conduit is at least about 2:1.

138. The apparatus as set forth in claim 132 wherein the ratio of the cross-sectional area of said permeate conduit to the cross-sectional area of said backflush conduit is at least about 5:1.

139. The apparatus as set forth in claim 132 wherein the ratio of the cross-sectional area of said permeate conduit to the cross-sectional area of said backflush conduit is from about 10:1 to about 100:1.

140. The apparatus as set forth in claim 109 or 113 wherein said permeate conduit comprises a permeate inlet in fluid communication with said filter membrane and said backflush conduit comprises a backflush outlet in fluid communication with said filter membrane.

141. The apparatus as set forth in claim 140 wherein said backflush conduit is arranged such that said backflush outlet is located from about 1 to about 15 mm from said filter membrane.

142. The apparatus as set forth in claim 140 wherein said backflush conduit is adapted for movement for

adjusting the location of said backflush outlet relative to said filter membrane.

143. The apparatus as set forth in claim 140 wherein said permeate conduit further comprises a permeate outlet in fluid communication with a permeate collector.

144. The apparatus as set forth in claim 143 wherein said permeate collector is integrated within said filtration head.

145. The apparatus as set forth in claim 140 wherein said backflush conduit further comprises a backflush inlet in fluid communication with a source of backflushing liquid.

146. The apparatus as set forth in claim 145 wherein said source of backflushing liquid comprises a source vessel.

147. The apparatus as set forth in claim 146 wherein said source vessel is integrated within said filtration head.

148. The apparatus as set forth in claim 109 or 113 further comprising means for measuring the conductivity of the permeate.

149. The apparatus as set forth in claim 148 further comprising an electrode holder having an inlet at the inlet of the permeate conduit or downstream thereof with respect to permeate flow and electrodes for measuring the electrical conductivity of the permeate stream.

150. The apparatus as set forth in claim 109 or 113 further comprising means for measuring the conductivity of the retentate.

151. The apparatus as set forth in claim 150 further comprising an electrode holder having an inlet in fluid communication with a probe tip adapted for placement in said retentate for removing a portion thereof.

152. The apparatus as set forth in claim 109 or 113 further comprising a tubular housing around said permeate and backflush conduits, wherein said support and membrane are mounted on the distal end of said housing and the inlet of said permeate conduit and the outlet of said backflush conduit are spaced inwardly of said membrane within said housing.

153. The apparatus as set forth in claim 152 further comprising a peripheral flange means at the distal end of said housing wherein the inlet of said permeate conduit and outlet of said backflush conduit are spaced inwardly of said peripheral flange means within said housing.

154. The apparatus as set forth in claim 153 further comprising an O-ring which maintains a seal with said housing.

155. The apparatus as set forth in claim 153 further comprising an electrode within said tubular housing.

156. The apparatus as set forth in claim 155 further comprising a cap having a threaded connection with the proximate end of said housing for securing the end of the permeate conduit at the distal end of said housing or the end of the backflush conduit at the distal end of said housing against said electrode.

157. The apparatus as set forth in claim 152 wherein one of said permeate and backflush conduits is concentrically disposed inside the other.

158. The apparatus as set forth in claim 157 wherein said backflush conduit is disposed inside said permeate conduit to form an annular space between the two conduits.

159. The apparatus as set forth in claim 158 further comprising a fitting having a threaded connection with said permeate conduit around said backflush conduit for holding said backflush conduit in fixed position relative to said permeate conduit.

160. The apparatus as set forth in claim 109 or 113 comprising an elongate housing orienting an inlet to the permeate conduit at the distal end of the housing proximate the downstream surface of the filter membrane and orienting an outlet for the backflush conduit at the distal end of the housing proximate the downstream surface of the filter membrane.

161. An apparatus for filtration of each of a plurality of dispersions of particulate solids in fluid media, the apparatus comprising:

a plurality of filter membranes each adapted for flow of fluid therethrough in a filtering direction to form a plurality of separate permeate streams;

a plurality of permeate conduits, each of said permeate conduits being positioned to receive permeate from a membrane of said plurality of membranes that is separate from any of said plurality of membranes from which any other of said plurality of permeate conduits is positioned to receive permeate; and

a plurality of backflush conduits for directing a backflushing liquid through said filter membranes, each of said backflush conduits being oriented for backflushing a membrane that is separate from any membrane which any other of said plurality of backflush conduits is oriented to backflush.

162. The apparatus as set forth in claim 161 wherein said plurality of filter membranes comprises an array of filter membranes oriented for contemporaneous parallel delivery of said plurality of dispersions to said plurality of membranes.

163. The apparatus as set forth in any of the preceding claims 161 through 162 further comprising a plurality of permeate reception zones, each of said permeate reception zones being in fluid flow communication with a membrane of said plurality, each of said plurality of reception zones being positioned to receive permeate from a membrane different from the membrane from which any other of said plurality of reception zones is positioned to receive permeate.

164. The apparatus as set forth in claim 163 wherein said plurality of permeate reception zones comprises an array of permeate reception zones oriented for contemporaneous parallel delivery of said plurality of permeates to said plurality of reception zones.

165. The apparatus as set forth in any of the preceding claims 161 through 164 further comprising a plurality of spatially discrete vessels, each of said vessels being operatively associated with a membrane of said plurality of membranes for exposure of the membrane to a dispersion contained in the vessel, the membrane with which each of said plurality of vessels is associated being separate from any membrane with which any other of said plurality of vessels is associated.

166. The apparatus as set forth in claim 165 wherein said plurality of vessels comprises an array of vessels oriented for contemporaneous parallel filtration operations.

167. The apparatus as set forth in any of the preceding claims 161 through 166 wherein said filter membranes, permeate conduits and backflush conduits comprise an assembly.

168. The apparatus as set forth in claim 167 further comprising a robot arm connected to said assembly.

169. The apparatus as set forth in claim 168 wherein said robot arm can be adapted for locating said assembly such that said filter membranes are in a filtering position.

170. The apparatus as set forth in claim 169 wherein said robot arm can be adapted for movement of said assembly in the vertical direction.

171. The apparatus as set forth in claim 170 wherein said assembly is adapted for placement in a filtering position such that each of said filter membranes is positioned to receive a dispersion separate any of the other dispersions of said plurality of dispersions.

172. The apparatus as set forth in claim 171 wherein said assembly is adapted for placement in a filtering position by lowering said assembly.

173. The apparatus as set forth in claim 172 wherein said assembly is adapted for placement in a filtering position by securing said assembly in a fixed position.

174. The apparatus as set forth in claim 173 wherein said assembly comprises a monolithic support comprising a plurality of spatially discrete filtering regions, each of said plurality of filtering regions comprising a filter membrane, a spatially discrete backflush conduit and a spatially discrete permeate conduit.

175. The apparatus as set forth in claim 173 wherein said assembly comprises a plurality of spatially discrete filtration heads, each of said plurality of filtration heads comprising a filter membrane, a permeate conduit and a backflush conduit.

176. The apparatus as set forth in claim 175 wherein said assembly comprises means for securing said filtration heads in an array.

177. The apparatus as set forth in claim 175 further comprising a plurality of vessels containing dispersion specimens and being arranged in an array corresponding to the array of said filtration heads, said assembly adapted for placement in a position whereby each of said plurality of filter membranes is immersed in the dispersion present in one of said vessels separate from any vessel in which any other of said filter membranes is positioned.

178. A process for adjusting the composition of a dispersion comprising particulate matter and a fluid medium, the process comprising:

exposing a surface of a filter membrane to a dispersion comprising particulate matter and a fluid medium, the dispersion having a first concentration of the particulate matter in the fluid medium,

removing some of the fluid medium from the dispersion by causing fluid to flow through the membrane to form a permeate downstream of the membrane and a retentate upstream thereof, whereby the concentration of the particulate matter in the fluid medium of the retentate increases over time relative to the first concentration of the dispersion,

sampling the retentate intermittently over time to form at least two retentate samples, the at least two retentate samples having different concentrations of particulate matter in the fluid medium.

179. The process of claim 178 wherein the filter membrane is supported on a filtration head.

180. The process of claim 178 further comprising introducing a wash liquid into the retentate.

181. The process of claim 178 wherein the retentate is sampled using a automated sampling robot.

182. The process of claim 178 wherein the retentate samples are deposited on a common substrate.

183. The process of claim 178 or 182 further comprising analyzing the retentate samples for a property of interest.

184. A process for adjusting the composition of each of a plurality of dispersions comprising particulate matter and a fluid medium, the process comprising:

concurrently exposing each of a plurality of filter membranes to a dispersion of said plurality of dispersions, the dispersion to which each of said plurality of membranes is exposed being separate from any dispersion to which any other of said plurality of membranes is exposed;

removing some of the fluid medium from each of the plurality of dispersions by concurrently causing fluid to flow through each of said membranes to form a permeate downstream of each membrane and a retentate upstream thereof, thereby forming a plurality of separate permeates and a plurality of separate retentates; and

sampling each of the plurality of retentates to form at least two separate retentate samples.

185. The process of claim 184 wherein each of the filter membrane are supported on discrete filtration heads.

186. The process of claim 184 further comprising introducing a wash liquid into each of the plurality of retentates.

187. The process of claim 184 wherein the plurality of retentates are sampled using one or more automated sampling robots.

188. The process of claim 184 wherein the retentate samples are deposited on a common substrate.

189. The process of claim 184 or 188 further comprising analyzing each of the plurality of retentate samples for a property of interest.